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TITLE: SILICON NITRIDE-BASED CERAMIC  
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INVENTOR-INFORMATION:

NAME

ITSUDO, YASUHIRO  
YONEZAWA, TAKESHI  
ONUMA, YOSHIYUKI  
INOUE, HIROSHI

ASSIGNEE-INFORMATION:

NAME

TOSHIBA CORP

COUNTRY

N/A

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ABSTRACT:

PURPOSE: To obtain the titled ceramics having a high rupture toughness value and superior strength at high temp. by adding powder of TiN or metallic Ti to Si<SB>3</SB>N<SB>4</SB> powder in combination with Y<SB>2</SB>O<SB>3</SB>, Al<SB>2</SB>O<SB>3</SB> or the like as an additive for sintering and by sintering the resulting powdery mixture.

CONSTITUTION: Si<SB>3</SB>N<SB>4</SB> powder is mixed with Y<SB>2</SB>O<SB>3</SB>, Al<SB>2</SB>O<SB>3</SB> or the like as an additive for

cooling rate from the calcination temperature to 100°C is adjusted to  
≤30°C/min. The sintered silicon nitride produced by this process has  
uniform texture, contains ≤50% of intergranular crystal based on whole  
intergranular phase and has a maximum pore diameter of ≤10 μm and a pore  
ratio of ≤0.5%. The sintering assistant used in the sintered material is  
preferably those containing  $Y_2O_3$ ,  $ZrO_2$  and MgO. The present production process enables the production of a  
sintered uniform silicon nitride having small maximum pore diameter and pore ratio  
excellent characteristics such as abrasion resistance and rolling fatigue life.  
Accordingly, the sintered silicon nitride produced by the present process can  
be extremely effectively used as an abrasion-resistant member, sliding member,  
etc., as well as a bearing member.

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